

What is claimed is:

1. A fluorochemical composition comprising a major amount of organic solvent and 0.05% by weight to 5% by weight of fluorochemical oligomer dispersed or dissolved in said organic solvent and said fluorochemical oligomer being represented by the general formula:

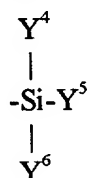


wherein X represents the residue of an initiator or hydrogen;

$M^f$  represents units derived from fluorinated monomers;

- 10  $M^h$  represents units derived from a non-fluorinated monomers;

$M^a$  represents units having a silyl group represented by the formula:



wherein each of  $Y^4$ ,  $Y^5$  and  $Y^6$  independently represents an alkyl group, an aryl group or a hydrolyzable group;

- 15 G is a monovalent organic group comprising the residue of a chain transfer agent;

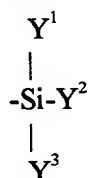
n represents a value of 1 to 100;

m represents a value of 0 to 100;

r represents a value of 0 to 100;

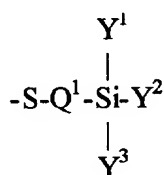
and  $n+m+r$  is at least 2;

- 20 with the proviso that at least one of the following conditions is fulfilled: (a) G is a monovalent organic group that contains a silyl group of the formula:



wherein Y<sup>1</sup>, Y<sup>2</sup> and Y<sup>3</sup> each independently represents an alkyl group, an aryl group or a hydrolyzable group with at least one of Y<sup>1</sup>, Y<sup>2</sup> and Y<sup>3</sup> representing a hydrolyzable group; or (b) r is at least 1 and at least one of Y<sup>4</sup>, Y<sup>5</sup> and Y<sup>6</sup> represents a hydrolyzable group.

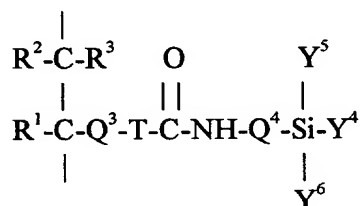
- 5     2. Fluorochemical composition according to claim 1 wherein at least one of Y<sup>1</sup>, Y<sup>2</sup> and Y<sup>3</sup> and/or at least one of Y<sup>4</sup>, Y<sup>5</sup> and Y<sup>6</sup> is a hydrolyzable group selected from the group consisting of halogen, an alkoxy group, an acyloxy group, an acyl group and an aryloxy group.
- 10    3. Fluorochemical composition according to claim 1 wherein said monovalent organic group G corresponds to the general formula:



- 15     wherein Y<sup>1</sup>, Y<sup>2</sup>, Y<sup>3</sup> have the meaning as defined in claim 1 or 2 and wherein Q<sup>1</sup> represents an organic divalent linking group.

4. Fluorochemical composition according to claim 1 wherein M<sup>f</sup> comprises a unit derived from a fluorinated monomer of the formula:  
C<sub>4</sub>F<sub>9</sub>-Q<sup>2</sup>-E<sup>1</sup>
- 20     wherein E<sup>1</sup> represents a free radical polymerizable group and Q<sup>2</sup> represents an organic divalent linking group.

5. Fluorochemical composition according to claim 1 wherein M<sup>a</sup> is a unit derived corresponding to the formula:

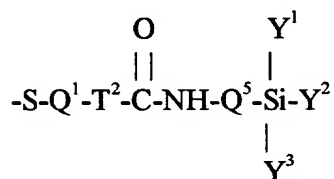


25

wherein  $R^1$ ,  $R^2$  and  $R^3$  each independently represents hydrogen, an alkyl group, an aryl group or halogen,  $Q^3$  represents an organic divalent linking group, T represents O or NR with R being hydrogen, an aryl or a  $C_1$ - $C_4$  alkyl group, and  $Y^4$ ,  $Y^5$  and  $Y^6$  have the meaning as defined in claim 1.

5

6. Fluorochemical composition according to claim 1 wherein G corresponds to the formula:



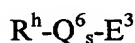
wherein  $Q^1$  and  $Q^5$  each independently represents an organic divalent linking group,  $T^2$  represents O or NR with R being hydrogen, an aryl or a  $C_1$ - $C_4$  alkyl group, and  $Y^1$ ,  $Y^2$  and  $Y^3$  have the meaning as defined in claim 1.

10

7. Fluorochemical composition according to claim 1 wherein the composition is a homogeneous composition further comprising water and an organic or inorganic acid.

15

8. Fluorochemical composition according to claim 1 wherein the units derived from non-fluorinated monomers are units derived from non-fluorinated monomers corresponding to the general formula:



wherein  $R^h$  represents a hydrocarbon group,  $Q^6$  is a divalent linking group, s is 0 or 1 and  $E^3$  is a free radical polymerizable group.

20

9. Method of treating a substrate comprising applying to said substrate a composition according to claim 1.

25

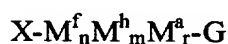
10. Method of treating a substrate comprising applying to said substrate a composition according to claim 1 and exposing a thus obtained coated substrate to water and an organic or inorganic acid.

11. Method of treating a substrate according to claim 9 further comprising the step of exposing the coated substrate to an elevated temperature of 60°C to 300°C.

5 12. Method according to claim 9 wherein said substrate is selected from the group consisting of plastics, ceramics and glass.

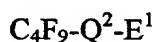
13. Substrate comprising a coating derivable from the coating composition of any of claim 1 wherein the substrate is selected from the group consisting of plastics, ceramics and  
10 glass.

14. Fluorochemical oligomer corresponding to the formula:



wherein X represents the residue of an initiator or hydrogen;

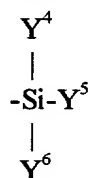
15  $M^f$  represents units derived from fluorinated monomers having the formula:



wherein  $E^1$  represents a free radical polymerizable group and  $Q^2$  represents an organic divalent linking group;

$M^h$  represents units derived from non-fluorinated monomers;

20  $M^a$  represents units having a silyl group represented by the formula:



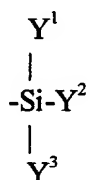
wherein each of  $Y^4$ ,  $Y^5$  and  $Y^6$  independently represents an alkyl group, an aryl group or a hydrolyzable group, with the proviso that at least one of  $Y^4$ ,  $Y^5$  and  $Y^6$  represents a hydrolyzable group;

25 G represents a monovalent organic group comprising the residue of a chain transfer agent;  
n represents an integer of 1 to 100;  
m represents an integer of 0 to 100;

r represents an integer of 0 to 100;

and n+m+r is at least 2;

with the proviso that at least one of the following conditions is fulfilled: (a) G is a monovalent organic group that contains a silyl group of the formula:



5

wherein  $Y^1$ ,  $Y^2$  and  $Y^3$  each independently represents an alkyl group, an aryl group or a hydrolyzable group with at least one of  $Y^1$ ,  $Y^2$  and  $Y^3$  representing a hydrolyzable group; or (b) r is at least 1 and at least one of  $Y^4$ ,  $Y^5$  and  $Y^6$  represents a hydrolyzable group.

10 15. Fluorochemical oligomer having the formula:

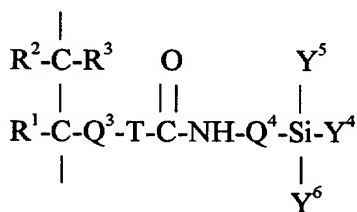


wherein X represents the residue of an initiator or hydrogen;

$M^f$  represents units derived from fluorinated monomers;

$M^h$  represents units derived from non-fluorinated monomers;

15  $M^a$  represents units having the formula:



wherein  $R^1$ ,  $R^2$  and  $R^3$  each independently represents hydrogen, an alkyl group, an aryl group or halogen,  $Q^3$  represents an organic divalent linking group, T represents O or NR

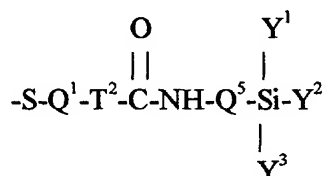
20 with R being hydrogen, an aryl or a  $C_1$ - $C_4$  alkyl group, and wherein each of  $Y^4$ ,  $Y^5$  and  $Y^6$  independently represents an alkyl group, an aryl group or a hydrolyzable group, with the proviso that at least one of  $Y^4$ ,  $Y^5$  and  $Y^6$  represents a hydrolyzable group;

G represents a monovalent organic group comprising the residue of a chain transfer agent;

n represents an integer of 1 to 100;  
 m represents an integer of 0 to 100;  
 r represents an integer of 1 to 100;  
 and n+m+r is at least 2.

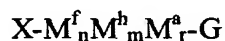
5

16. Fluorochemical oligomer according to claim 15 wherein G corresponds to the formula:

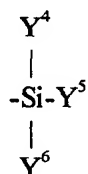


10 wherein Q<sup>1</sup> and Q<sup>5</sup> each independently represents an organic divalent linking group, T<sup>2</sup> represents O or NR with R being hydrogen, an aryl or a C<sub>1</sub>-C<sub>4</sub> alkyl group, and Y<sup>1</sup>, Y<sup>2</sup> and Y<sup>3</sup> each independently represents an alkyl group, an aryl group or a hydrolyzable group with at least one of Y<sup>1</sup>, Y<sup>2</sup> and Y<sup>3</sup> representing a hydrolyzable group.

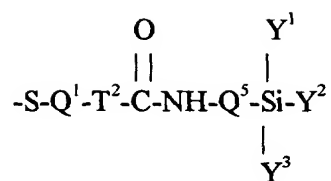
17. Fluorochemical oligomer having the formula:



15 wherein X represents the residue of an initiator or hydrogen;  
 M<sup>f</sup> represents units derived from fluorinated monomers;  
 M<sup>h</sup> represents units derived from a non-fluorinated monomers;  
 M<sup>a</sup> represents units having a silyl group represented by the formula:



20 wherein each of Y<sup>4</sup>, Y<sup>5</sup> and Y<sup>6</sup> independently represents an alkyl group, an aryl group or a hydrolyzable group, with the proviso that at least one of Y<sup>4</sup>, Y<sup>5</sup> and Y<sup>6</sup> represents a hydrolyzable group;  
 G corresponds to the formula:



wherein Q<sup>1</sup> and Q<sup>5</sup> each independently represents an organic divalent linking group, T<sup>2</sup> represents O or NR with R being hydrogen, an aryl or a C<sub>1</sub>-C<sub>4</sub> alkyl group, and Y<sup>1</sup>, Y<sup>2</sup> and Y<sup>3</sup> each independently represents an alkyl group, an aryl group or a hydrolyzable

5 group with at least one of Y<sup>1</sup>, Y<sup>2</sup> and Y<sup>3</sup> representing a hydrolyzable group;

n represents an integer of 1 to 100;

m represents an integer of 0 to 100;

r represents an integer of 0 to 100;

and n+m+r is at least 2.

10